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(21) Application no.	Jitsu Ko Hei 4-89020	(71) Applicant	000103518	
(22) Date of application	December 25, 1992			The Ohtsu Tire & Rubber Co., Ltd. 9-1, Kawahara-cho, Izumiotsu City, Osaka Prefecture
		(72) Inventor		Kazuma KANAOKA 362, Shigeki, Uchita Town, Naga County, Wakayama Prefecture
		(74) Representative		Toshio YASUDA, Chartered Patent Agent

(54) [Name of Invention] Smoking pipe

(57) [Summary]

[Configuration] The characteristics of this invention are described as follows:

It has a pipe on one end in which a mouthpiece is installed and a removable recessed holder for attaching the cigarette on the other end. The inside of the pipe is filled with porous glass fiber and the cigarette holder is a cylinder made of porous glass with multiple venting holes.

[Effect] The effect of this invention is described as follows:

As a user uses this pipe to smoke a cigarette, nicotine and tar contained in the smoke that the user inhales are removed through the porous glass filter. Similarly, nicotine and tar contained in the secondhand smoke are also removed through the surface of the holder as the smoke passes through. Thus, with the use of the smoking pipe in question, not only a smoker but people around him or her can avoid inhaling toxic nicotine substances.

{The figure of the smoking pipe}

[Claimed Utility Model Registration]

[Claim 1] A smoking pipe whose characteristics are described as follows:

It has a pipe on one end in which a mouthpiece is installed and a removable cigarette holder on the other end. The inside of the pipe is filled with porous glass fiber and the cigarette holder is a cylinder made of porous glass with multiple venting holes.

[Brief Explanations of the Figures]

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Naoko Hirose, Certified Translator  
Member #2392 of the Association of Translators, Terminologists, and Interpreters of Ontario  
Member, by affiliation, of the Canadian Translators, Terminologists, and Interpreters Council  
565 Bloor St. W., Suite 1, Toronto, Ontario, M5S 1Y6 Canada

[Translation from the Japanese document]

[Figure 1] This is an oblique perspective figure that shows the smoking pipe in an implementation of this invention.

[Figure 2] This is a cross-section figure that shows the smoking pipe in an implementation of this invention.

[Figure 3] This is a cross-section figure that shows the smoking pipe in an alternative implementation of this invention.

[Legend]

- 1. Pipe
- 2. Holder
- 3. Mouthpiece
- 4. Porous glass fiber filter
- 8. Venting holes
- 10. Smoking pipe
- 20. Smoking pipe
- 21. Pipe
- 22. Holder
- 25. Venting holes

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[Translation from the Japanese document]

[Detailed Explanation of the Invention]

[0001]

[Field of Industrial Application]

This invention is regarding a pipe that is used to remove nicotine and tar during cigarette smoking.

[0002]

[Conventional Technology]

Nicotine and tar contained in cigarette smoke are harmful to human health; therefore, pipes that remove or absorb them are being used.

A typical conventional smoking pipe has a mouthpiece on one end, a piece to hold the cigarette on the other, and a nicotine removal filter inside.

[0003]

[Issue that the Invention Is Trying to Resolve]

However, the filter installed in the conventional smoking pipe is able to absorb and/or remove nicotine contained in the smoke that a smoker inhales, but not the nicotine contained in secondhand smoke when the smoker is not smoking. Because of this, the conventional smoking pipe is effective for the smoker, but people around the smoker are forced to inhale the toxic nicotine even though they are not smoking, just like when there is no such filter.

[0004]

This invention is motivated by the abovementioned issue. The objective is to provide a smoking pipe that can absorb and remove the nicotine contained in secondhand smoke as well as the one contained in smoke inhaled directly by the smoker.

[0005]

[Means to Resolve the Issue]

The characteristics of this invention are described as follows:

It has a pipe on one end in which a mouthpiece is installed and a removable cigarette holder on the other end. The inside is filled with porous glass fiber and the cigarette recess is a cylinder made of porous glass with multiple venting holes.

[0006]

[How It Works]

With the cigarette installed in the holder of the smoking pipe, light the cigarette and smoke. While smoking, the smoker inhales smoke that passed through the porous glass fiber installed inside the pipe. When the smoker is not smoking, secondhand smoke is emitted to the surroundings through venting holes on the holder.

Because the porous glass fiber has a large absorption effect due to the characteristics of fine pores, it absorbs nicotine and tar. By combining it with moisture adhered on the glass surface, the nicotine and tar are conveniently captured. It thus functions as a so-called nicotine removal filter.

[0007]

In this way, the nicotine and tar contained in smoke that a smoker inhales are removed by the porous glass fiber installed inside the pipe. The nicotine and tar contained in secondhand smoke are removed upon emission from the holder.

[0008]

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[Translation from the Japanese document]

[Embodiment]

The following is the explanation of the implementation of this inventive smoking pipe based on the figures. Figure 1 shows an implementation the smoking pipe of this invention 10 and Figure 2 shows this smoking pipe 10 with a cigarette 9 inserted. In the smoking pipe 10, the cigarette holder 2 is designed to be removable by fitting it to one end of the cigarette holding part 5 of the pipe 1 to which a mouthpiece 3 is installed on the other end.

[0009]

Pipe 1 is made of thermally stable plastic such as ABS and polycarbonate and is filled with filter 4 made of porous glass fiber. The porous glass fiber used in this invention is created by phase-separating alkali borosilicate glass into silica phase and boric acid alkali phase through heat treatment, and by eluting the boric acid alkali phase through acid treatment. Particularly, the one with the following characteristics is favored due to its superior in heat resistance and absorption performance.

[0010]

Fine pore diameter: 50Å or smaller

BET surface area: 400 m<sup>2</sup>/g or larger

Fine pore volume: 0.4 ~ 0.6 cm<sup>3</sup>/g

Main component: SiO<sub>2</sub> 96% by weight or larger

The cigarette holder 2 is a cylinder made of porous glass with both ends open. The fitting 6 on one end of the recess 2 is attached to the holding part 5 of the pipe 1 so that a cigarette 9 can be inserted from the insertion opening 7 on the other end. Fine pores of porous glass found all over the surface of the recess 2 function as venting holes 8. For the porous glass to make the cigarette holder 2, the one with the following characteristics is favored from the viewpoint of ventilation.

[0011]

Fine pore diameter: 0.05 ~ 15.0 μm

BET surface area: 0.1 ~ 4.0 m<sup>2</sup>/g

Fine pore volume: 0.4 ~ 0.6 cm<sup>3</sup>/g

Main component: SiO<sub>2</sub> approx. 70% by weight

Al<sub>2</sub>O<sub>3</sub> 15% by weight

B<sub>2</sub>O<sub>3</sub> 7% by weight

Smoking a cigarette 9 installed in the holder 2, moisture, nicotine, and tar in the smoke adhere the surface of the porous glass fiber of filter 4 by the dehumidifying effect and absorption effect. The nicotine and tar are conveniently captured as they combine with the moisture. Consequently, the smoker can inhale smoke that does not contain toxic nicotine and the likes. On the other hand, secondhand smoke that occurs when the smoker is not smoking passes through the cigarette holder 2 and is emitted into the air. Thus, the nicotine and tar contained in the secondhand smoke are captured and removed by the porous glass of the holder 2. As a result, people around the smoker can avoid inhaling harmful nicotine and tar contained in secondhand smoke.

[0012]

Also, oxygen is supplied through venting holes opened all over the surface of the recess 2, so the cigarette can stay lit while installed in the holder 2. The wall of the holder 2 is in contact with the burning cigarette. However, in the case of porous glass for which over approximately 70% is composed of SiO<sub>2</sub> by weight, for example, the permissible temperature is around 1,000 °C which is high, so the contact time is not considered very long. Because of these factors, the holder 2 has been verified not to deform.

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[Translation from the Japanese document]

[0013]

The cigarette holder 2 of this invention does not have to be a cylinder of which the inside diameter is equal to the outside diameter of the cigarette 9, and may be any cylinder which creates a gap between the cigarette 9 and the wall of the holder 2 as long as its structure can hold the cigarette. Having such a gap prevents direct contact of the burning cigarette 9 and the holder 2. This is favorable from the point of view of thermal resistance, because it widens the range of usable compositions that are usable for the porous glass.

[0014]

Also, as in the smoking pipe 20 indicated in Figure 3, the holder 22 may cover the entire cigarette 9 with its one end closed. In this case, the cigarette 9 is held by the holding part 23 of the pipe 2 and the holder 22 is attached by mounting the fitting part 24, which is the open end of the holder 22, on the holding part 23. For the smoking pipe 20, after mounting the pre-lit cigarette 9 onto the holding part 23, the holder 22 shall be attached as if it envelopes the cigarette 9. When secondhand smoke goes out through the porous glass wall of the holder 22, the nicotine and tar contained in the secondhand smoke are captured and removed from the smoke. In Figure 3, venting holes, which are fine pores of the porous glass that composes the holder 22, are indicated as 25.

[0015]

[Effect of this Invention]

This invention has a following effect:

As a user uses this pipe to smoke a cigarette, nicotine and tar contained in the smoke that the user inhales are removed through the porous glass filter. Similarly, nicotine and tar contained in the secondhand smoke are also removed when the smoke passes through the wall of the holder. Thus, with the use of the smoking pipe of this invention, not only the smoker but also the people around him or her can avoid inhaling toxic nicotine substances.

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